

ELECTRONIC WARFARE

IW 150

OPR: Major Bob Wicks

DESCRIPTION: This lesson discusses the Information Warfare pillar, Electronic Warfare.

METHODOLOGY: Informal Lecture/1Hour

OBJECTIVE: The objective of this lesson is for each student to comprehend electronic warfare and how it can be integrated into Information Warfare operations.

SAMPLES OF BEHAVIOR:

1. Define electronic warfare.
2. Explain the subdivisions of electronic warfare.
3. Identify the tools of electronic warfare.
4. Explain how the subdivisions of EW can be integrated to support the IW portion of a campaign plan.

REQUIRED READING:

1. *JP 3-13.1 Joint Doctrine for Command and Control Warfare (C2W), Chapter II, Section 5 "Electronic Warfare" Instructional Circular pages 150-H-1 through 150-H-2.*
2. *Air Force Instruction 10-706 "Electronic Warfare," Paragraphs 1-4, Instructional Circular pages 150-H-3 through 150-H-17.*

RECOMMENDED READING

1. *Air Force Doctrine Document 2-5.1 Electronic Warfare, "All.*

IW 150
ELECTRONIC WARFARE
NOTETAKER

Definition of Electronic Warfare (EW): Any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. *Joint Pub 1-02.*

EW Subdivisions:

Electronic Attack (EA): That division of electronic warfare involving the use of electromagnetic (EM) or directed energy (DE) to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability.

1.

2.

3.

4.

Electronic Protection (EP): That division of EW involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of EW that degrade, neutralize, or destroy friendly combat capability.

1.

2.

3.

4.

Electronic Warfare Support (ES): ES is the division of EW involving actions tasked by or under direct control of an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition.

1.

2.

5. Electronic Warfare

All three aspects of EW, electronic attack (EA), electronic protection (EP), and electronic warfare support (ES), **contribute to the C2W effort**. **EA** is concerned with denying an adversary commander use of the electronic spectrum to effectively command and control operating forces. **EP** is involved with guaranteeing use of the electronic spectrum for the JFC to command and control friendly forces. **ES** contributes to the JFC's accurate estimate of the situation in the operational area. Joint doctrine is contained in Joint Pub 3-51, "Electronic Warfare in Joint

a. **EW in C2-attack**. Each of the three divisions of EW — ES, EA, and EP — can contribute to C2-attack operations.

- **ES**, in the form of **combat information**, can provide the real-time information required to locate and identify C2 nodes and supporting/ supported early warning and offensive systems during C2-attack missions. ES, used to produce **signals intelligence (SIGINT)**, can provide timely intelligence about an adversary's C2 capabilities and limitations that can be used to update previously known information about the adversary's C2 systems. This updated information can be used to plan C2-attack operations and provide battle damage assessment (BDA) and feedback on the effectiveness of the overall C2W plan.
- **EA** — whether jamming, electromagnetic deception, or destruction of C2 nodes with directed-energy (DE) weapons or antiradiation missiles (ARMs) — **has a major role to play in almost all C2-attack operations** in a combat environment.
- **EP's role** in C2-attack and other operations **is to protect the electromagnetic (EM) spectrum for use by friendly forces**. Coordination of the use of the EM spectrum by friendly forces through the Joint Restricted Frequency List (JRFL) is a means of preventing fratricide among friendly electronic emissions. Equipment and procedures designed to prevent adversary disruption or exploitation of the EM spectrum are the best means friendly forces have to ensure their own uninterrupted use of the EM spectrum during C2-attack operations.



Electronic warfare support in the form of combat information can provide the real-time information required to locate and identify C2 nodes.

b. **EW in C2-protect**. Each of the three divisions of EW can also make a contribution to friendly C2-protect efforts.

- **ES**, supported by SIGINT data, **can be used to monitor for impending adversary attack** on friendly C2-nodes. ES, in the form of Signal Security monitoring, can be used to identify potential sources of information for an adversary to obtain knowledge about friendly C2 systems.
- **EA**, whether jamming, electromagnetic deception, or DE weapons/ARMs **can be used to defend a friendly force** from adversary C2-attack.
- **EP should be used in C2-protect to safeguard friendly forces** from exploitation by adversary ES/SIGINT operations. Frequency deconfliction through the use of the JRFL is also a key to a



Electronic attack, whether in the form of jamming, electromagnetic deception or destruction of C2 nodes, has a major role to play in almost all C2 attack operations. Which specific weapons should be used to accomplish physical destruction as part of a C2W plan is situation-dependent.

successful coordinated defense against adversary C2-attack operations.



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This Instruction implements AFR 10-7, *Command and Control Warfare (C2W)*. It defines the EW components, states EW objectives, and directs the integration of EW into all aspects of military planning and operations. It provides guidance and procedures for developing and implementing the Air Force Electronic Warfare Mission. It assigns responsibilities for employment of EW. It implements Department of Defense (DOD) Directive 3222.4, July 31, 1992, with changes 1 and 2 and the Chairman, Joint Chiefs of Staff (CJCS) Memorandum of Policy (MOP) 6, *Electronic Warfare (EW)*, Issued -- 19 January 1990, 1st Revision -- 3 March 1993; CJCS MOP 30, *C2W*, Issued -- 17 July 1990, 1st Revision -- 8 March 1993; and AFM 2-8, *Electronic Combat (EC) Operations*, 30 June 1987.

1. Electronic Warfare (EW) Definition (MOP 6) Any military action involving the use of electro-magnetic or directed energy to control the electromagnetic spectrum or to attack the enemy.

2. Electronic Warfare Components. The three major subdivisions of Electronic Warfare are Electronic Attack (EA), Electronic Protection (EP), and EW Support (ES).

2.1. Electronic Attack (EA). EA is the division of EW involving the use of electromagnetic or directed energy to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability. EA includes:

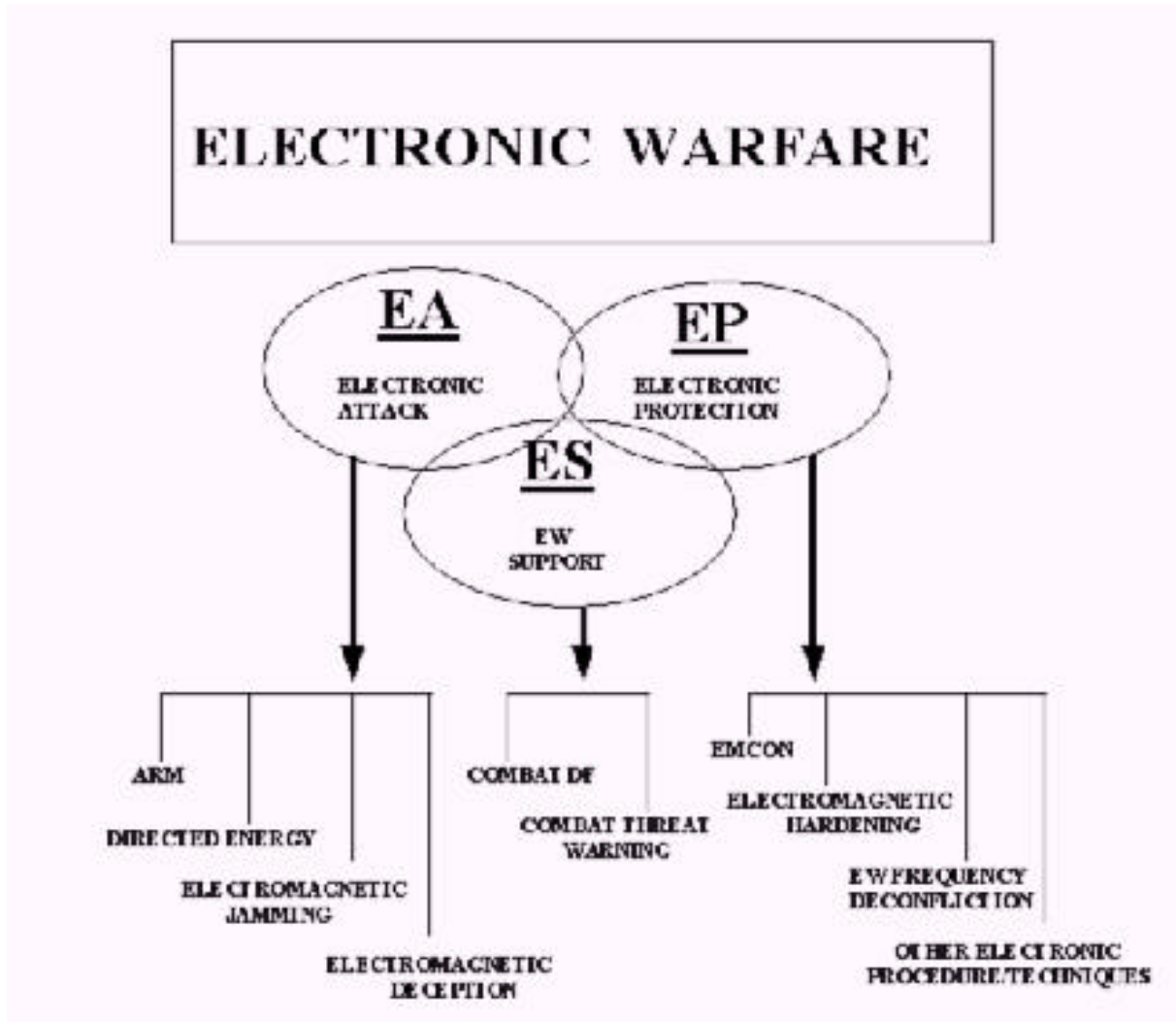
2.1.1. Actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception.

2.1.2. Employment of weapons that use either electromagnetic or directed energy as their primary destructive mechanism (lasers, radio frequency weapons, particle beams).

2.2. Electronic Protection (EP). EP is the division of EW involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of EW that degrade, neutralize, or destroy friendly combat capability.

2.3. EW Support (ES). ES is the division of EW involving actions tasked by or under direct control of an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, ES provides information required for immediate decisions involving electronic warfare operations and other tactical actions such as threat avoidance, targeting and homing. ES data can be used to produce signal intelligence (SIGINT), communications intelligence (COMINT), and electronic intelligence (ELINT).

Figure 1. Electronic Warfare Subdivisions.



3. Electronic Warfare Purpose. EW is a specialized task performed by aerospace forces to control selected parts of the electromagnetic spectrum in support of operations across all levels of conflict. Proper employment of EW enhances the ability of US operational commanders to achieve military objectives. EW is a force multiplier. Control of the electromagnetic spectrum has a major impact on the success of military operations.

4. Electronic Warfare Principles. Electronic systems must be designed to operate in the presence of hostile EW. Employment of a successful EW strategy involves four steps: exploit, avoid, degrade, and destroy. Exploiting the EW environment involves mapping the electronic environment, including knowing what, where, and how many hostile electronic systems face friendly forces. Evaluating their numbers, locations, abilities and weaknesses is fundamental for effective EW planning. Avoidance of hostile electronic detection and defensive systems is often the best course of action. However, when avoidance is not possible, it may be necessary to degrade or destroy the enemy's electronic defense systems. Personnel assigned to operate electronic systems must conduct EW training in order to recognize and operate in a hostile electromagnetic environment. Proper use of the electromagnetic spectrum impacts the success or failure of military operations. To be effective, EW must be supported by all functional areas to include operations, intelligence, planning, training, logistics support, development, systems acquisition and testing.

5. Electronic Warfare Training. EW training across the spectrum of warfare is an essential element of military preparedness and must receive strong, continued emphasis. The increasing integration of EW capabilities into weapon and communications systems requires that "Fundamentals of EW" instruction be provided, not simply procedural operation of equipment, as an integral part of overall systems training. The training environment must be representative of the expected battle environment to ensure that the highest possible state of combat readiness is achieved, and training should be oriented toward joint and combined operations.

6. Office of the Secretary of the Air Force (OSAF) Responsibilities Are as Follows.

6.1. SAF/AQ.

6.1.1. Will provide and coordinate overall electronic warfare (EW) program management direction. This includes modifications, initial system acquisitions, integration design and implementation efforts, developmental programs, and advanced research studies.

6.1.2. Will establish clear lines of responsibility and accountability for reliability and maintainability improvement of EW systems.

6.1.3. Will comment on Mission Needs Statements (MNSs), Operational Requirements Documents (ORDs), Cost and Operational Effectiveness Analyses (COEAs) and Test and Evaluation Master Plans (TEMPs).

6.1.4. Will establish clear and technically achievable EW equipment programs (to include reliability and maintainability goals), schedules, and planned system modernization to meet EW requirements.

6.1.5. Will ensure EW acquisition programs adhere to OPSEC (including emission control [EMCON]) procedures for all aspects of EW operations, intelligence, planning, training, logistics support, systems development and acquisition, and testing.

6.1.6. Will provide direction to the Air Force Information Warfare Center (AFIWC) for study tasks involving EW concept and vulnerability analyses related to acquisition matters.

6.1.7. Will provide input to the DOD Electronic Warfare (EW) Master Plan for Acquisition Roadmap to USAF/XO.

6.1.8. Will ensure that all electronic systems for use by the USAF are designed to reduce their vulnerability to hostile exploitation, avoidance, degradation or destruction by electronic warfare means.

6.1.9. Will inform the Joint Chiefs of Staff (JCS), Unified, Specified, and Service component commanders of EW developments and actions taken to correct identified deficiencies.

6.1.10. Will ensure that acquisition strategy is based on Total Force policy.

6.1.11. Will participate in the Foreign Military Sales Electronic Combat (EC) Working Group.

6.1.12. Will provide executive tasking to WR-ALC/LN, the Electronic Warfare Product Group Manager (EW PGM), on acquisition related matters through HQ Air Force Materiel Command (AFMC).

6.1.13. Will ensure validated EW requirements are priced and programmed in time-phased schedules that define actions to perform and resources to acquire and use in order to achieve stated program objectives.

6.2. SAF/IA.

6.2.1. Will act as a focal point for all military sales of EW systems to foreign governments and international organizations.

6.2.2. Will inform the JCS of proposed and actual sales of EW systems (to include hardware and software configuration) to foreign governments and international organizations.

6.2.3. Will co-chair the Foreign Military Sales Electronic Combat Working Group (FMS ECWG) with HQ USAF/XOFE.

7. Air Staff Assigned Responsibilities Are as Follows.

7.1. HQ USAF/XO.

7.1.1. Will establish Air Force Electronic Warfare Policy.

7.1.2. Will develop and conduct periodic reviews, assessments, and updates of EW doctrine.

7.1.3. Will organize, train, and equip EW forces and systems required to achieve US military objectives.

7.1.4. Will advocate MAJCOM EW priorities.

7.1.5. Will advise the JCS of deficiencies in EW force structure.

7.1.6. Manages the HQ USAF Mission Need Statement (MNS) and Operational Requirements Document (ORD) process.

7.1.7. Serves as the executive agency for managing Air Force mission needs and operational requirements that result in research, development, test, and evaluation (RDT&E), and procurement appropriations. Articulates mission deficiencies and needs for operating commands.

7.1.8. Will advocate a Total Force EW capability to ensure Air Force Reserve (AFRES) and Air National Guard (ANG) forces are comparable to active duty forces with similar equipment and readiness requirements.

- 7.1.9. Will coordinate with other services for the use of Air Force EW assets in joint training exercises.
- 7.1.10. Will advocate to the intelligence community the commanders' operational requirements for intelligence support to EW.
- 7.1.11. Will develop the USAF EW Master Plan.
- 7.1.12. Will determine Electronic Attack (EA) pod and support equipment allocation priorities and inform HQ Air Combat Command. Resolve EA jamming pod allocation issues that cannot be resolved in the EA Jamming Pod Allocation Conference.
- 7.1.13. Will provide overall management of the Air Force Electronic Warfare Integrated Reprogramming (EWIR) process. (See AFI 10-703)
- 7.1.14. Will co-chair the Foreign Military Sales EC Working Group with SAF/IA and form other EC working groups, as required. The ECWG will forward to the Air Staff and SAF/IA recommended USAF policies and procedures for the conduct of foreign military sales and security assistance programs of EW systems, support, and training.
- 7.1.15. Will approve the use of wartime EW combat settings outside the continental United States (CONUS).
- 7.1.16. Together with SAF/AQ, will represent the US Air Force on the DOD EW Master Plan and Acquisition Roadmap.
- 7.1.17. Will represent the Air Force on the NATO Air EW Working Group.
- 7.1.18. Will advocate establishment of coherent and inclusive research, development, test, and evaluation (RDT&E) databases for use in evaluating EW systems prior to their inclusion in the Air Force inventory.
- 7.1.19. Will monitor MAJCOM EW training programs.
- 7.1.20. Will establish and maintain a system to fully integrate operations, intelligence, logistics, research and development (R&D), communications, and other support functions necessary to provide reprogramming of EW systems in response to threat changes.
- 7.1.21. Will establish management processes at all command levels to ensure existing and future EW capabilities meet the requirements of combating the threat identified in operational plans. These processes will also ensure the incorporation of current and future EW capabilities into operational plans.
- 7.2. HQ USAF/IN (and Subordinate Organizations).
- 7.2.1. Will provide properly formatted all-source intelligence data to the Air Component Commander in support of EW operations, EW weapon system acquisition, and EW system reprogramming, and training.
- 7.2.2. Will constantly monitor and analyze threat systems, intelligence indicators, and warnings to prevent technological surprises.
- 7.2.3. Will present pertinent information to the appropriate agencies and commanders in the most efficient manner.

7.2.4. Will organize and validate the USAF policy for the release of EW materiel and information to friendly foreign governments.

7.2.5. Will coordinate with HQ Air Intelligence Agency (AIA), HQ AFMC, and other intelligence producers/agencies (including sister Service and Joint organizations) to ensure production and maintenance of standardized threat databases.

7.2.6. Will provide executive tasking to the AFIWC on operational issues.

7.2.7. Will provide intelligence to AFMC in support of EW acquisition programs.

7.2.8. Will participate in the Foreign Military Sales EC Working Group and provide intelligence support to foreign military sales customers (as coordinated through formal EC FMS channels).

7.2.9. Will determine and assess an enemy's capability to use the electromagnetic environment and its equipment.

7.2.10. Will evaluate USAF systems and process vulnerabilities to EW and recommend changes and work-arounds.

7.2.11. Will provide information and techniques on how to deny the enemy effective use of the electromagnetic environment and its equipment.

7.2.12. Will exploit electromagnetic radiation from hostile organizations and nations.

7.2.13. Will evaluate the effects of EW and ensure that operational commanders receive timely feedback.

7.3. HQ USAF/LG.

7.3.1. Will interface with the operations and acquisition communities in recommending strategies to support EW systems. Reliability, maintainability, and commonality must be integral parts of the EW system's design and development.

7.3.2. Will identify initial provisions and war reserve spares for the Total Force. Will establish suitable wartime spares requirements in conjunction with MAJCOMs.

7.3.3. Will develop EW logistics programs in balance with modernization efforts and the operating capability of each resource.

7.4. HQ USAF/PE.

7.4.1. Will develop consolidated recommendations on all USAF EW programs for Global Reach--Global Power Resource Allocation Teams during Planning, Programming, and Budgeting System deliberations.

7.4.2. Will validate manpower in coordination with MAJCOM personnel requirements to fill EW positions for current and future systems.

7.5. HQ USAF/TE.

7.5.1. Will establish EW test and evaluation policy and lead the effort to develop EW Measures of Effectiveness (MOE).

7.5.2. Will provide senior leadership with information on test progress and potential problems as early as possible.

7.5.3. Will maintain an adequate infrastructure to support T&E.

7.5.4. Will plan, program, budget for, and administer the EW test infrastructure, such as:

7.5.4.1. Major ranges and test facilities (*Note: not operational test ranges, such as Western Training Center*).

7.5.4.2. EW test resources.

7.5.4.3. Developmental Testing (DT) (Substantive and Comprehensive, with Accountability in Reporting) and Operational Testing (OT) (Rigor, Realism, and Candor) processes.

7.5.5. Will develop a credible EW test and evaluation (T&E) Plan which provides both development testing (DT) and operational testing (OT) necessary to support the acquisition process.

7.5.6. Will review MNSs, COEAs, ORDs, and TEMP's for adequacy regarding test and evaluation issues.

7.6. HQ USAF/SC.

7.6.1. Will coordinate with HQ USAF/XO on frequency compatibility issues related to EW systems and operations.

7.6.2. Will ensure that EW (electronic protection) is considered in the development of communications-electronics systems.

7.6.3. Will advocate communication and data systems in support of EWIR.

7.6.4. Will ensure EW communications training programs are realistic.

7.7. HQ USAF/DP.

7.7.1. Will provide oversight for EW personnel programs.

7.7.2. Will budget for and manage the resources for HQ Air Education and Training Command (AETC) EW Training programs.

7.8. NGB/AQ, NGB/LG and AF/REOR.

7.8.1. Will assist HQ USAF/XO in identifying EW deficiencies and required EW capabilities.

7.8.2. Will review and monitor EW programs programmed for the ANG and AFRES.

8. All MAJCOMs.

8.1. Will integrate EW principles into training scenarios to provide realism in preparation for all levels of conflict.

8.2. Will establish requirements for EW capabilities and maintain sufficient numbers of EW systems and support equipment to ensure adequate wartime capability and sustainability.

8.3. Will ensure, in coordination with unified and specified commands, EW is a part of all operational plans. EW must be included in all levels of conflict, training, exercises, and testing.

8.4. Will develop peacetime emission control (EMCON) procedures to protect equipment operating characteristics while conducting testing and training.

- 8.5. Will coordinate current equipment update efforts with future EW requirements and capabilities to maintain a viable and effective EW mix. EW requirements must be merged with other survivability considerations to ensure they complement each other and are affordable.
- 8.6. Will participate in the EA Jamming Pod Allocation Conference. All MAJCOMs will provide HQ ACC with their projected EA jamming pod requirements NLT one month prior to the conference.
- 8.7. Will maintain a capability for the operational and engineering evaluation of EW systems, techniques, and tactics in combat operations and for operational tests, training, and exercises.
- 8.8. Will prioritize requirements to correct EW R&D, procurement, or system program deficiencies.
- 8.9. Will advise the Chief of Staff, US Air Force, when unable to provide EW forces or capabilities required to meet command and Air Force objectives.
- 8.10. Will develop procedures, with other services, for joint development of tactics and plans for the use of EW resources.
- 8.11. Will support the EWIR process IAW AFI 10-703 (formerly AFR 55-24).
- 8.12. Will develop EW MNSs and ORDs IAW AFI 10-601 (formerly AFR 57-1) in close coordination with the implementing command and AFISC to resolve major issues.
- 8.13. Will advocate an EW capability for MAJCOM-gained AFRES and ANG forces, which is comparable to active duty forces with similar missions and taskings in support of Total Force policies.
- 8.14. Will determine personnel requirements to fill EW positions for current and future weapons systems.
- 8.15. Will ensure communications-electronics plans are directly related to EW plans.
- 8.16. Will ensure frequency deconfliction/compatibility is part of all operational plans.
- 8.17. Will ensure EW capabilities and vulnerabilities are considered in planning, developing, and acquiring communications-electronics systems.
- 8.18. Will support and budget for the Simulation Validation (SIMVAL) process in close coordination with AIA
- 8.19. Will establish procedures for conducting combined Canadian Forces (CF) and USAF EA-EP operations and training.
- 8.19.1. Before conducting airborne EA operations and radar EP evaluation flights against air defense units in Canada, USAF commands must notify the Canadian Headquarters Fighter Group (CHFG) and comply with directions. (USAF commands concerned are authorized to communicate directly with the CHFG to establish necessary directives for implementing and reporting air-borne EA operations.)
- 8.19.2. Classified defense information that must be furnished to the CF or its representatives to support airborne EA operations must be processed according to AFI 16-201 guidance as USAF disclosure policy permits.
- 8.19.3. USAF commands must provide the CHFG with reports showing size, type, and disposition of routine airborne EA training sorties and EA exercises conducted against all or part of the Canadian based portion of the air defense system in North America. (These reports enable the CF

to evaluate the performance of that portion of the system and especially to evaluate the validity of its EP and techniques.)

9. Specific MAJCOM, Field Operating Agency (FOA), Air Force Center and Air Component Commander Responsibilities.

9.1. Air Combat Command (ACC).

9.1.1. Will chair the EA Jamming Pod Allocation Conference. This conference will be conducted annually or as deemed necessary by HQ ACC. The purpose of the conferences will be to allocate external EA jamming pod resources (to include support equipment) among all using MAJCOMs. All resulting EA pod allocation issues that cannot be resolved by mutual agreement will be for-warded to HQ USAF/XO for resolution. EA jamming pod allocation shall consider but not be limited to unit, aircraft type, and mission.

9.1.2. Will, whenever possible, in conjunction with Strategic Command (STRATCOM), North American Aerospace Defense Command (NORAD), AFRES, and ANG, regularly plan, schedule and conduct airborne EA and EP activities on routine training sorties.

9.1.3. Will plan, schedule, and conduct EA and EP evaluation flights against air defense units in Canada to the maximum extent possible.

9.2. Air Mobility Command (AMC).

9.2.1. Will allocate EW equipment for appropriate units.

9.2.2. Will, whenever possible, in conjunction with AFRES and ANG, regularly plan, schedule and conduct airborne EA and EP activities on routine training sorties.

9.3. Air Force Special Operations Command (AFSOC).

9.3.1. Will allocate EA pods and EW equipment to appropriate units.

9.3.2. Will, whenever possible, in conjunction with AFRES and ANG, regularly plan, schedule and conduct airborne EA and EP activities on routine training sorties.

9.4. Air Force Materiel Command (AFMC).

9.4.1. Will develop and acquire new EW systems.

9.4.2. Will develop and maintain a program to:

9.4.2.1. Ensure EW systems, equipment, components, and techniques required by the using commands are developed, tested, and procured. Ensure AFMC will coordinate with AFIWC and MAJCOMs during the development and modification process.

9.4.2.2. Ensure EW systems relying on parametric characteristics of hostile electromagnetic equipment will be rapidly reprogrammable.

9.4.3. Ensure support, communications, and command and control systems for new weapons incorporate EW capabilities and vulnerabilities in planning, development, and acquisition phases.

9.4.4. Ensure simulation and test facilities, capable of replicating existing threat characteristics, are available to fully evaluate EW system capabilities.

- 9.4.5. Ensure EW signature characteristics (radar cross section [RCS], infrared [IR], and antenna patterns) are measured for systems in development, and are forwarded to the central repository at the AFIWC.
- 9.4.6. Provide for worldwide logistics and engineering support for both the hardware and software elements of EW systems and associated support, training, and range equipment.
- 9.4.7. Develop, incorporate, and maintain the capability to support the user in making mission data changes.
- 9.4.8. Build a database of EW program historical information for use in analysis by AFIWC and other required organizations.
- 9.5. WR-ALC/LN, Electronic Combat Product Group Manager (EC PGM).
 - 9.5.1. Will participate in EW systems definition development and production decisions and will:
 - 9.5.1.1. Identify, recommend, and guide laboratory efforts in available and emerging technologies for application and risk.
 - 9.5.1.2. Ensure multi-application equipment programs are technically and fiscally executable with strong up-front planning and analysis.
 - 9.5.1.3. Recommend opportunities for commonality to include other services and friendly foreign government programs.
 - 9.5.2. Will establish an Air Force focal point for identifying and recommending joint-potential EW programs under development by other services for Air Force implementation.
 - 9.5.3. Will coordinate EW systems schedules with appropriate program offices.
 - 9.5.4. Will coordinate software configuration management among using commands.
 - 9.5.5. Will coordinate on EW related MNS, ORDs, and TEMPS.
 - 9.5.6. Will develop and maintain a comprehensive EW Test Resources Action Plan to guide the planning, development, and procurement of EW test resources.
 - 9.5.7. Will incorporate support and training equipment requirements in acquisition and modification developments. Capability of hardware and software updates must be assured.
- 9.6. Air Force Studies and Analysis Agency (AFSAA).
 - 9.6.1. When requested, will provide analysis of proposed EW acquisitions (budgetary) to determine their impact on aircraft survivability. These include:
 - 9.6.1.1. Conducting trade-off studies for projected acquisitions.
 - 9.6.1.2. Providing impact assessments of EW contributions to the military objectives for Total Force employment.
- 9.7. Air Intelligence Agency (AIA).
 - 9.7.1. Will provide support to operational commanders in planning and executing EW operations.
 - 9.7.2. Will maintain the Air Force Information Warfare Center (AFIWC), part of which is an operational EW support center.
- 9.8. Air Force Information Warfare Center (AFIWC).

- 9.8.1. AFIWC will be the primary agency for EW concepts, mission area analysis, database support, and system vulnerability analyses during EW systems life cycle.
- 9.8.2. Will respond to HQ USAF/XO tasking on operational issues and to SAF/AQ on acquisition issues.
- 9.8.3. Will evaluate and report on the effectiveness of EW over the entire spectrum of conflict, training, and exercises.
- 9.8.4. Will monitor the operational capability of EW equipment and employment concepts in relation to hostile threats.
- 9.8.5. Will inform MAJCOMs and HQ USAF of the status of total EW capabilities and provide recommendations for improvements, as required.
- 9.8.6. Will support the EW planning and operations of all MAJCOMs by constructing and maintaining an all-source, standardized, EW library and database on all US and friendly foreign weapon systems to include: EW bibliographic data, parametric data, electromagnetic signatures (RCS, IR, and antenna pattern) data.
- 9.8.7. Will provide MAJCOMs with technical EW assistance to include planning, employing, developing, testing, and training activities.
- 9.8.8. Will provide technical help in the area of unintentional radiation emissions.
- 9.8.9. Will assist and coordinate with MAJCOMs on EW-related MNSs, ORDs, TEMPps, and PMD development.
- 9.8.10. Will conduct threat-change impact assessment.
- 9.8.11. Will develop and maintain measures of effectiveness for EW system testing.
- 9.8.12. Will support Air Force EW-related tests with special data collection and analysis upon request.
- 9.8.13. Will exchange and coordinate historical program data with AFMC on EW systems for analysis
- 9.8.14. Will support the integration of EW, along with other elements of C2W, into Information Warfare planning and execution.
- 9.9. Air Force Space Command (AFSPC).
 - 9.9.1. Will assess the EW threat against space operations and ensure that EW is considered in the development of all appropriate space systems to maximize protection of space borne assets.
 - 9.9.2. Will ensure, in coordination with applicable unified and specified commands, that EW is a part of all operational plans.
 - 9.9.3. Will support MAJCOM EW requirements for space borne communications and support systems.
- 9.10. Air Education and Training Command (AETC).
 - 9.10.1. Will provide EW instruction to Air Force personnel.

9.10.2. Will provide formal continuation and introductory EW training through the Electronic Warfare Officer (EWO) Staff Refresher Course (B-V7C-O), the Senior Officer EC Course (B-V7C-G), the Introduction to EC and Introduction to C2W Courses for non-EWO personnel (B-V7C-E and S-V8F-C), and the EC Coordinator Course (S-V8E-S).

9.10.3. Will include EW instruction in the curricula of all courses related to EW.

9.10.4. Will assist AFMC in defining EW training center requirements for example, training devices such as the Simulator for Electronic Combat Training (SECT).

9.11. Air Force Operational Test and Evaluation Center (AFOTEC).

9.11.1. Will maintain the capability to evaluate EC systems, techniques, and tactics in combat operations, operational tests, training, and exercises. Evaluations must include correlation of all applicable intelligence inputs.

9.11.2. Will recommend EW test policies to HQ USAF/TE.

9.12. Air Component Commander.

9.12.1. Will plan for the employment of EW to support an Information Warfare (IW) strategy.

9.12.2. Will plan for the employment of EW to support Suppression of Enemy Air Defense (SEAD) operations.

10. Combined Canadian Forces and USAF EA-EP Operations and Training. In order to achieve optimum electronic attack (EA) and electronic protection (EP) capabilities, the Canadian Forces (CF) and USAF have agreed that:

10.1. Effective EP for CF and USAF air defense units are indispensable to the combined air defense of the North American continent.

10.2. Use of combined CF-USAF resources for conducting EA-EP operations and training in Canada and the US is vital to both countries.

10.3. Classified defense information that must be furnished to the CF or its representatives to support these agreements must be processed according to AFI 16-201 [formerly AFR 200-9] as USAF disclosure policy permits.

10.4. The Canadian Headquarters Fighter Group has agreed to provide USAF commands with reports showing the scores of routine airborne EA training sorties and data to permit a comprehensive EA analysis.

RALPH E. EBERHART, Lt General, USAF
DCS/Plans and Operations

Attachment 1

GLOSSARY OF REFERENCES, ABBREVIATIONS, AND ACRONYMS

References

AFPD 10-7, *Command and Control Warfare*
AFPD 10-11, *Operations Security (OPSEC)*
AFPD 10-6, *Mission Needs and Operational Requirements*
AFI 10-301, *Responsibilities for Air Reserve Component Forces*
AFI 10-601, *Mission Needs and Operational Requirements Guidance and , Procedures*
AFI 10-702, *Psychological Operations*
AFI 10-703, *Electronic Warfare Integrated Reprogramming (EWIR)*
AFI 10-704, *Tactical Deception Program*
AFI 10-705, *Command and Control Warfare Procedures*
AFI 10-707, *Air Force Spectrum Interference Resolution Program*
AFI 10-708, *Military Deception Program*
AFI 16-201, *Foreign Disclosure of Classified and Unclassified Military Information to Foreign Government and International Organizations*
AFI 63-101, *Acquisition System Procedures*
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AFI 99-103, *Air Force Test and Evaluation Process*
AFM 1-1, *Basic Aerospace Doctrine of the USAF*
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AFT 51-45, *Electronic Warfare Principles*

Abbreviations and Acronyms

~~ACC~~ Air Combat Command
~~AETC~~ Air Education and Training Command
~~AFFMA~~ Air Force Frequency Management Agency
~~AFI~~ Air Force Instruction

~~AFIWC~~–Air Force Information Warfare Center
~~AFMC~~–Air Force Materiel Command
~~AFOTEC~~–Air Force Operational Test and Evaluation Center
~~AFPD~~–Air Force Policy Directive
~~AFRES~~–Air Force Reserve
~~AFSAA~~–Air Force Studies and Analysis Agency
~~AFSOC~~–Air Force Special Operations Command
~~AFSPC~~–Air Force Space Command
~~AIA~~–Air Intelligence Agency
~~ANG~~–Air National Guard
~~AQ~~–Directorate for Acquisition
~~C2W~~–Command and Control Warfare
~~CF~~–Canadian Forces
~~CONUS~~–Continental United States
~~DOD~~–Department of Defense
~~DP~~–Directorate for Personnel
~~EA~~–Electronic Attack
~~EC~~–Electronic Combat
~~EC PGM~~–Electronic Combat Program Group Manager
~~EMCON~~–Emission Control
~~EP~~–Electronic Protection
~~ES~~–Electronic Warfare Support
~~EW~~–Electronic Warfare
~~EWIR~~–Electronic Warfare Integrated Reprogramming
~~IA~~–International Affairs
~~IN~~–Directorate for Intelligence
~~IR~~–Infrared
~~JCS~~–Joint Chiefs of Staff
~~LG~~–Directorate for Logistics
~~MAJCOM~~–Major Command
~~MOP~~–Memorandum of Policy
~~NORAD~~–North American Aerospace Defense Command

OPSEC~~Operation Security~~
ORD~~Operational Requirements Document~~
PE~~Directorate for Programs and Evaluations~~
R&D~~Research and Development~~
RCS~~Radar Cross Section~~
RDT&E~~Research, Development, Test, and Evaluation~~
SAF~~Secretary of the Air Force~~
SC~~Directorate for Communications~~
SEAD~~Suppression of Enemy Air Defenses~~
SIR~~Spectrum Interference Resolution~~
STRATCOM~~Strategic Command~~
TE~~Directorate for Test and Evaluation~~
TEMP~~Test and Evaluation Master Plan~~
XO~~Directorate for Plans and Operations~~